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Management of radicular cyst using platelet rich fibrin- A case report

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ABSTRACT

Radicular cysts are inflammatory lesions of the jaws in the tooth-bearing areas. These lesions more commonly involve the apex of the associated tooth and have a well-defined radiolucency. Platelet rich fibrin is known as a healing biomaterial in oral surgical defect with the new aspect of advanced healing of a bony defect. The present case is of large radicular cyst associated with root canal treated maxillary permanent incisors in a 28-year-old boy and its surgical management with PRF augmentation as a healing biomaterial in the bony defect. One-year follow-up showed satisfactory healing. Healing was relatively fast and enhanced by placement of PRF without any post-operative complications.

Keywords: platelet rich fibrin, surgical management, radicular cyst

1. INTRODUCTION

As per definition, "Cyst is a pathological cavity more often lined by an epithelium, filled with fluid or semifluid material but not pus" (Aslan & Şimşek, 2002)." Cysts are classified as developmental or odontogenic (Kartika et al., 2020). Radicular cysts are odontogenic in origin (Lim & Peck, 2002; Padmawar et al., 2021). Amongst the cystic lesions in the jaws, radicular cysts are the most commonly occurring (Namrata N Patil, 2018). They comprise about 52.3% of jaw cysts and 62% of cysts of odontogenic origin (Sevekar et al., 2018). Chronic trauma or caries or injuries to teeth might lead to pulpal irritation of the teeth involved which results in necrosis as well as furthermore chronic apical periodontitis. This inturn causes cell proliferation and causes initiation of cystic degeneration. Radicular cysts occur due to inflammation arising as a result of stimulation of epithelial cell rests of malassez in ligament of periodontium (Lim & Peck, 2002). Development of cyst occurs in three phases that are cyst initiation, cyst formation and cyst enlargement (Koju, 2019). The incidence is found to be highest in between the third and fifth decade. When compared to women, occurrence in men is more common. Most commonly involved region is maxillary anterior followed by mandibular premolar region. A radicular cyst is mostly asymptomatic and therefore goes unnoticed. It is mostly detected accidentally on routine radiographic

examination. Some patients present with swelling in the cystic region, mobility as well as displacement of the teeth (Shear, 1992).

2. CASE REPORT

A patient 28 year age came to the Conservative and Endodontics Department with the chief complaint of swelling in the front upper and left region of the jaw since 1 year. The swelling was associated with mild intermittent pain. The swelling size was initially small 8 months back and later on gradually increased to its current size of 3*4 cm. Patient did not complain of any systemic disease hence the past medical history was not significant. He confirmed history of trauma due to road traffic accident 1 year back. On further questionnaire, the patient gave the history of root canal treatment irt 11, 12, 21; 8 months back followed by re-root canal treatment 3months back. These findings were further confirmed by the previous dental reports. On extra oral examination, no gross facial asymmetry was seen. A single non tender left submandibular lymph node of size 1x0.5cm approx. was palpable. On examination intraorally, swelling was seen on upper labial mucosa which was diffuse and nontender. Size was approximately seen 3 cm × 4 cm marking it's extending from the distal side of 21 to distal aspect 12. The swelling's overlying surface appeared erythematous. Investigations advised to the patients were intraoral periapical radiograph and occlusal radiograph. The Intraoral periapical radiograph and occlusal radiograph showed a very well-defined radiolucency involving periapical region irt 12, 11 and 21. A well-defined sclerotic border was present around the radiolucency irt 12 to 21 (fig.1 & fig.2).



Figure 1 Pre-operative Intraoral periapical radiograph

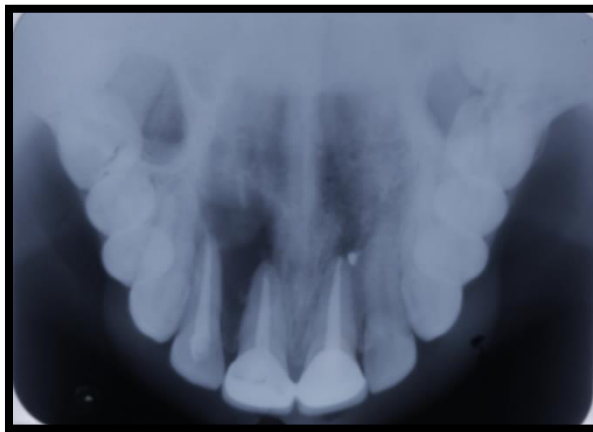


Figure 2 pre-operative Occlusal radiographs

Based upon all the above findings a provisional diagnosis of periapical cyst irt 11, 12 and 21 was made. Treatment plan was formulated accordingly. Since the previously done endodontic treatment was seen satisfactory irt 12 to 22, surgical enucleation of

the cyst along with curettage was done (fig.3 & fig.4). After the cystic lining was completely removed, the defect was then filled with PRF (fig.5a & 5b).

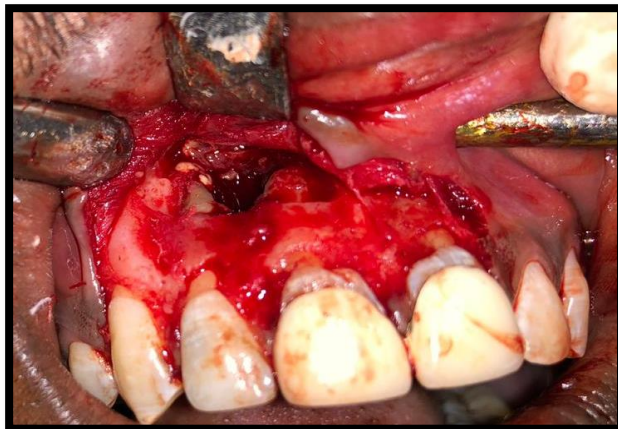


Figure 3 Surgical enucleation of the cyst.



Figure 4 shows complete curettage of the cyst

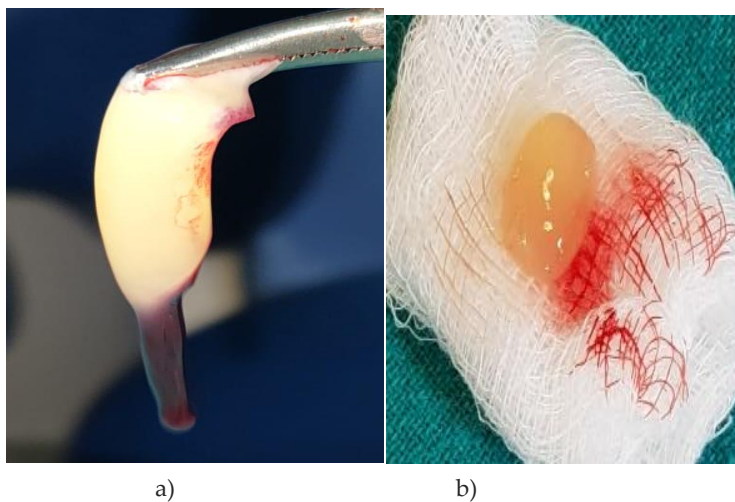


Figure 5 a) & b) shows collection of Platelet Rich Fibrin



Figure 6 Post-operative intraoral after suture placement.

It was then sent for histopathological examination. Histopathological evaluation showed epithelium which was nonkeratinized squamous, stratified and with arcading/palisading pattern. The connective tissue that was underlying was seen to be fibro-collagenous that had severe infiltrate of inflammatory cells chiefly lymphocytes and plasma cells. Correlating the overall features, a final diagnosis of infected Radicular cyst was provided. Patient was recalled for suture removal 1 week later and follow up was planned at 6 months and then 1 year. Patient reported with no sign of recurrence or complications at 1 year and radiographic examination showed satisfactory healing (fig.7).

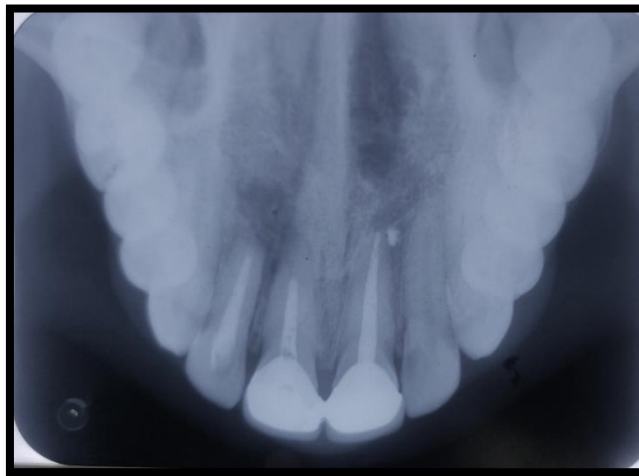


Figure 7 post-operative Occlusal radiographs

3. DISCUSSION

The word Cyst is a word of Greek origination namely “Kystis” meaning a “bag, bladder or a sac” (Nair, 1998). A definition of a cyst is “pathological cavity with an epithelial lining, which grows in an expansion mode centrifugally” (Sailor & Pajarola, 1999). Radicular cyst is “cavity that is fluid filled and which arises from the residues of the epithelial cells in the periodontal ligament, i.e, cells from rests of Malassez due to inflammation, sequelae to pulp tissue that is non-vital” (Kramer et al., 1992). One most commonly occurring cyst affecting maxilla is the radicular cyst. In the current case, the radicular cyst was involving the maxillary anterior as stated in the literature. The first step in cyst formation is initiation which progressively results in formation of cyst and thereby slowly grows outward, including the surrounding bone as well as other vital structures around it. Swelling and pain are reported if the cyst is infected. The current case manifested both swelling as well as pain in upper anterior region. Depending upon the place and the extent of the cystic lesion, the texture of the bone in the cystic walls as well as its proximity to the present vital structures, there are various treatment modalities for cystic lesions. Marsupialization or enucleation or marsupialization followed by enucleation or endodontic treatment followed by enucleation and marsupialization (Bodner, 2002; Cawson et al., 2002; Dhote et

al., 2017). This case report represents enucleation of a comparatively large radicular cyst surgically and later on followed by PRF placement.

A proper root canal treatment is a prior requirement in radicular cyst cases to mitigate the infection's origin and to seal the portal of entry from bacteria and their byproducts. The surgical intervention presented aims the removal of periapical pathology in order to obtain healing of the periapical tissues and thereafter regeneration of the bone. Repair and Regeneration are the major two criteria for post-surgical outcome (Gaurav et al., 2015). The word "Regeneration" is defined as the "reconstitution or reproduction of an injured or a lost part as well as to restore the function and architecture of the periodontium" (Panda et al., 2014). Choukoun et al., (2001), developed Platelet-rich fibrin in France by tissue engineering the product. This has become extremely popular owing to its promising results by inducing healing of the bone (Khiste & Naik, 2013).

PRF is also known as the second-generation product of platelet. Healing of both hard as well as soft tissue is accelerated by the use of PRF. It is a fibrin meshwork, including contents like cells, growth factors and platelet cytokines. These contents are stored as well as released after some time period, thereafter acting like a resorbable membrane. In the concept of platelet gel therapy, this has proved to be a new paradigm shift. Autologous PRF is also a type of a biomaterial aiding in the process of healing. Current studies and research work have demonstrated the use of PFR in various arenas of dentistry. PRF has various advantages like its ease of preparation, easy handling, does not require any complex machine economical and time saving. PRF also has an added benefit of uplifting the immune system (Saluja et al., 2011).

4. CONCLUSION

The first mode of treatment of periapical cysts should be the non-surgical approach. Nevertheless, surgical management might also be required for a successful outcome, depending on the dimension and extent of the lesion. The current case was managed strategically by surgical enucleation along with platelet rich fibrin usage.

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Author Contributions

Details of contribution of each authors regards manuscript work & production.

Informed Consent

Written and oral informed consent was obtained from the patient in this study.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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